1: Virology. 1996 Mar 15;217(2):594-7.

ELSEVIER FULL-TEXT ARTICLE Links

Disassembly of the coliphage lambda replication complex due to heat shock induction of the groE operon.

Wegrzyn A, **Wegrzyn G**, **Taylor K**.

Laboratory of Molecular Biology, Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Gdansk.

We have found previously that, in contrast to the free O initiator protein of lambda phage or plasmid rapidly degraded by the Escherichia coli ClpP/ClpX protease, the lambda O present in the replication complex (RC) is protected from proteolysis. In amino acid-starved E. coli relA cells, a temperature shift from 30 to 43 degrees did not affect RC integrity, as judged from the unchanged level of stable lambda O observed; however, the same temperature shift in a complete medium resulted in the decay of this lambda O fraction, which suggested disassembly of the RC. Examination of this phenomenon revealed that for lambda RC disassembly, heat shock induction of the groE operon, coding for molecular chaperones of the Hsp60 class, is indispensable. Heat shock induction of the groE operon present on a multicopy plasmid inhibited the growth of infecting phage.

PMID: 8610451 [PubMed - indexed for MEDLINE]

Search notes

Mol Microbiol. 1997 May;24(4):687-95. Links

Structural analysis of the subunits of the trehalose-6-phosphate synthase/phosphatase complex in Saccharomyces cerevisiae and their function during heat shock.

Reinders A, **Burckert N**, **Hohmann S**, **Thevelein JM**, **Boller T**, **Wiemken A**, **De Virgilio C**.

Botanisches Institut der Universitat, Basel, Switzerland.

Synthesis of trehalose in the yeast Saccharomyces cerevisiae is catalysed by the trehalose-6-phosphate (Tre6P) synthase/phosphatase complex, which is composed of at least three different subunits encoded by the genes TPS1, TPS2, and TSL1. Previous studies indicated that Tps1 and Tps2 carry the catalytic activities of trehalose synthesis, namely Tre6P synthase (Tps1) and Tre6P phosphatase (Tps2), while TsI1 was suggested to have regulatory functions. In this study two different approaches have been used to clarify the molecular composition of the trehalose synthase complex as well as the functional role of its potential subunits. Two-hybrid analyses of the in vivo interactions of Tps1, Tps2, TsI1, and Tps3, a protein with high homology to TsI1, revealed that both TsI1 and Tps3 can interact with Tps1 and Tps2; the latter two proteins also interact with each other. In addition, trehalose metabolism upon heat shock was analysed in a set of 16 isogenic yeast strains carrying deletions of TPS1, TPS2, TSL1, and TPS3 in all possible combinations. These results not only confirm the previously suggested roles for Tps1 and Tps2, but also provide, for the first time, evidence that TsI1 and Tps3 may share a common function with respect to regulation and/or structural stabilization of the Tre6P synthase/phosphatase complex in exponentially growing, heat-shocked cells.

PMID: 9194697 [PubMed - indexed for MEDLINE]

1: Mol Microbiol. 1997 Nov;26(4):821-31.

Links

Heat shock induction by a misassembled cytoplasmic membrane protein complex in Escherichia coli.

Mourez M, **Skouloubris S**, **Betton JM**, **Dassa E**.

Unite de Programmation Moleculaire et Toxicologie genetique, CNRS URA 1444, Institut Pasteur, Paris, France. mmourez@pasteur.fr

We analysed the effects of the overproduction of parts or all of a multisubunit ATP-binding cassette (ABC) transporter, the MalFGK2 complex, involved in the uptake of maltose and maltodextrins in Escherichia coli. We found that production of the MalF protein alone was inducing the phtrA promoter, which is under the control of a recently discovered sigma factor, sigma24, involved in the response to extracytoplasmic stresses. The production level, stability and localization of MalF were not altered when produced without its partners, suggesting that the protein was correctly inserted in the membrane. Our results indicate that a large periplasmic loop located between the third and fourth transmembrane segment of MalF, the L3 loop, is responsible for phtrA induction: (i) deleted MalF proteins with no L3 loop or with a L3 loop lacking 120 amino acids do not induce the phtrA promoter; (ii) the export to the periplasm of the L3 loop alone or fused to MalE induces the phtrA promoter. Moreover, the proteolytic sensitivity of MalF is different when it is produced alone and when MalF and MalG are produced together, suggesting a change in the conformation and/or accessibility of MalF. These results suggest that some inner membrane proteins can be sensed outside the cytoplasm by a quality control apparatus or by the export machinery. Moreover, the observation of the phtrA induction by MalF could be a useful new tool for studying the insertion and assembly of the MalFGK2 complex.

PMID: 9427411 [PubMed - indexed for MEDLINE]